

EXECUTIVE SUMMARY

TITLE: Notice of Proposed Rulemaking (NPRM); Powerplant Instruments; Fuel Pressure Indication

SUMMARY: This notice proposes to amend the certification requirement for fuel pressure indicators on pump-fed engines to permit other alternatives to warn pilots of imminent fuel pressure loss. A fuel pressure indicator is not the only means currently available in the marketplace to warn the pilot of a fuel pump failure. The proposed change would allow manufacturers to utilize new technology to improve operation, economy, and engine life. With these goals met, engine reliability and longevity will improve, resulting in increased safety.

BACKGROUND: AOPA petitioned for new standards that would allow, on all pump-fed engines, a fuel flow system employing a differential pressure transducer to be accepted as an equivalent means of compliance to the current fuel pressure indicator requirements. Following receipt of AOPA's petition for rulemaking, the FAA requested that the Aviation Rulemaking Advisory Committee (ARAC) review the petition. The ARAC recommended that the FAA revise the certification standards for fuel pressure indicators. The ARAC working group agreed with AOPA's petition but feels the language is too restrictive. Major technical advances in the auto industry with engine systems and controls may offer improvements over the current warning systems. Avenues should be open allowing this ever-evolving technology to be used. The working group proposed wording that would allow the use of any system offering the pilot advance warning of a fuel pump failure.

WHO WOULD BE AFFECTED: Manufacturers and modifiers of part 23 airplanes.

SIGNIFICANT ISSUES: The Aviation Rulemaking Advisory Committee (ARAC) and industry have expressed a need for a revised airworthiness certification standard for fuel pressure indication to warn the pilot of a fuel pump failure in part 23 airplanes. This need would be addressed by the change proposed here.

COSTS AND BENEFITS: The proposed rule change would provide an equivalent or improved level of safety without involuntarily imposing new requirements or costs on aircraft manufacturers by allowing, not requiring, alternative means of warning pilots of fuel pressure loss. To the extent that it would encourage the development and utilization of comprehensive engine control, monitoring and diagnostic systems, it would contribute further benefits in the form of enhanced safety and improved fuel efficiency, power output, and engine life.

ENERGY IMPACT: The energy impact of the notice of proposed rulemaking has been assessed in accordance with the Energy Policy and Conservation Act (EPCA), P.L. 94-163, and Interim Agency

Guidelines. It has been determined that the notice of proposed rulemaking is not a major regulatory action under the provisions or the EPCA.

ENVIRONMENTAL IMPACT: The environmental impact of this notice of proposed rulemaking has been assessed in accordance with FAA Order 1050.1D, and it has been determined that the notice of proposed rulemaking is not a major Federal Action significantly affecting the environment.



U.S. Department
of Transportation

**FEDERAL AVIATION
ADMINISTRATION**

Washington, D.C. 20591

**PRELIMINARY REGULATORY EVALUATION,
INITIAL REGULATORY FLEXIBILITY DETERMINATION
AND TRADE IMPACT ASSESSMENT**

for the NPRM concerning

**POWERPLANT INSTRUMENTS:
FUEL PRESSURE INDICATION
14 CFR PART 23**

OFFICE OF AVIATION POLICY, PLANS, AND MANAGEMENT ANALYSIS
Aircraft Regulatory Analysis Branch, APO-320

Charles A. Aiken
February 1993

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I. INTRODUCTION

This regulatory evaluation examines the impacts of a proposed change to part 23 of the Federal Aviation Regulations. The proposed rule would revise § 23.1305(g), the certification requirement for fuel pressure indicators on pump-fed engines, by allowing alternative means of warning pilots of fuel pressure loss.

II. BACKGROUND

The original intent of the fuel pressure indication requirement (adopted in 1949) was to warn pilots of fuel pressure deficiencies before total engine failure occurred. Although fuel pressure indicators have proven effective, their benefits have diminished over the years with the introduction of more reliable fuel pumps, decreasing fuel pump failures, and the utilization of emergency fuel pumps in addition to the main fuel pump.

Past policy has resulted in confusion over what are acceptable and unacceptable means of fuel system monitoring, including indication and location of the pressure pick-up. In some installations utilizing a constant pressure pump, a differential pressure indicator measuring unmetered fuel pressure has been required at the fuel pump output. On the other hand, installations using a speed-sensing integral pump system have been approved with a fuel pressure indicator measuring metered fuel pressure at the fuel distribution valve. Airplanes utilizing this system have a fuel pressure indicator calibrated in fuel flow. Policy has allowed fuel indicators measuring metered fuel flow to be used as an equivalent means of compliance if the engine is certified with an

integral speed-sensing pressure pump and differential pressure is used for the measurement.

In recognition of this background and the fact that conventional fuel indicators are no longer the sole warning means of fuel pressure deficiencies, the Aircraft Owners and Pilots Association (AOPA) petitioned the FAA in July 1990 for a revised standard that would allow a fuel flow system employing a differential pressure transducer as an equivalent means of compliance. AOPA believes that this change would facilitate the development of new engine monitoring systems and could potentially reduce the instrument panel clutter that is common in today's general aviation aircraft.

The FAA requested the Aviation Rulemaking Advisory Committee (ARAC) to evaluate AOPA's petition and recommend a disposition to the FAA. The ARAC was chartered in February 1991, under the Federal Advisory Committee Act, to provide recommendations to the FAA Administrator on rulemaking relating to aviation safety issues.

Based on a review of the petition by the Fuel Indicators Working Group of its General Aviation and Business Airplane Subcommittee, ARAC recommends that the FAA revise the standard. While agreeing with the spirit of AOPA's petition, ARAC feels it is too restrictive. Citing technical advances and evolving technologies in engine control, monitoring, and diagnostic systems that offer many improvements over conventional warning systems, ARAC recommends acceptance of any system that provides effective advance warning of fuel pump failure.

III. ECONOMIC ANALYSIS

Because the proposed rule change would be optional by permitting, but not requiring, alternative means of warning pilots of fuel pressure loss, it would provide an equivalent or improved level of safety without involuntarily imposing new requirements or costs on aircraft manufacturers. On this basis, the FAA finds it to be cost-beneficial. To the extent that it would encourage the development and utilization of comprehensive engine control, monitoring and diagnostic systems, it would contribute further benefits in the form of enhanced safety and improved fuel efficiency, power output, and engine life.

IV. REGULATORY FLEXIBILITY DETERMINATION

The Regulatory Flexibility Act (RFA) of 1980 was enacted by Congress to ensure that small entities are not unnecessarily or disproportionately burdened by Government regulations. The RFA requires a Regulatory Flexibility Analysis if a rule is expected to have a "significant (positive or negative) economic impact on a substantial number of small entities." Based on the standards and thresholds of implementing FAA Order 2100.14A, Regulatory Flexibility Criteria and Guidance, the FAA has determined that the proposed rule would not have a significant impact on a substantial number of small aircraft manufacturers.

V. TRADE IMPACT ASSESSMENT

The proposed rule change would have no impact on the sale of United States products in foreign markets or the sale of foreign products in the United States.

FOR INSERTION INTO THE PREAMBLE

OF THE NPRM

CONCERNING

POWERPLANT INSTRUMENTS: FUEL PRESSURE INDICATION

FEBRUARY, 1993

Regulatory Evaluation Summary

Three requirements pertain to economic impacts of regulatory changes to the FARs. First, Executive Order 12291 directs Federal agencies to promulgate new regulations or modify existing regulations only if the potential benefits to society outweigh the potential costs. Second, the Regulatory Flexibility Act of 1980 requires agencies to analyze the economic impact of regulatory changes on small entities. Finally, the Office of Management and Budget directs agencies to assess the effects of regulatory changes on international trade. In conducting these analyses, the FAA has determined that this rule: 1) would generate benefits exceeding costs and is neither major as defined in the Executive Order nor significant as defined in DOT's Policies and Procedures; 2) would have no significant impact on a substantial number of small entities; and 3) would have no impact on international trade. These analyses, available in the docket, are summarized below.

Benefits and Costs

Because the proposed rule change would be optional by permitting, but not requiring, alternative means of warning pilots of fuel pressure loss, it would provide an equivalent or improved level of safety without involuntarily imposing new requirements or costs on aircraft manufacturers. On this basis, the FAA finds it to be cost-beneficial. To the extent that it would encourage the development and utilization of comprehensive engine control, monitoring and diagnostic systems, it would contribute further benefits in the form of enhanced safety and improved fuel efficiency, power output, and engine life.

Regulatory Flexibility Determination

The Regulatory Flexibility Act (RFA) of 1980 was enacted by Congress to ensure that small entities are not unnecessarily or disproportionately burdened by Government regulations. The RFA requires a Regulatory Flexibility Analysis if a rule is expected to have a "significant (positive or negative) economic impact on a substantial number of small entities." Based on the standards and thresholds of implementing FAA Order 2100.14A, Regulatory Flexibility Criteria and Guidance, the FAA has determined that the proposed rule would not have a significant impact on a substantial number of small aircraft manufacturers.

Trade Impact Assessment

The proposed rule change would have no impact on the sale of United States products in foreign markets or the sale of foreign products in the United States.



U.S. Department
of Transportation
Federal Aviation
Administration

Advisory Circular

DRAFT

Subject: FUEL PUMP FAILURE WARNING
IN PART 23 AIRPLANES

Date: MAR 18 1993
Initiated by: ACE-100

AC No: 23.1305-X
Change:

1. PURPOSE. This advisory circular (AC) sets forth an acceptable means, but not the only means, of showing compliance with § 23.1305(g) of the Federal Aviation Regulations (FAR), applicable to pilot warning of imminent fuel pump failure in part 23 airplanes. Accordingly, this material is neither mandatory nor regulatory in nature and does not constitute a regulation.

2. RELATED REGULATIONS. Listed below are the applicable FAR sections:

- § 23.955 - Fuel flow
- § 23.961 - Fuel system hot weather operation
- § 23.991 - Fuel pumps
- § 23.993 - Fuel system lines and fittings
- § 23.1183 - Lines, fittings, and components
- § 23.1305 - Powerplant instruments, General
- § 23.1322 - Warning, caution, and advisory lights
- § 23.1337 - Powerplant instruments, Instruments:
Installation
- § 23.1529 - Instructions for Continued Airworthiness
- § 23.1541 - Markings and Placards, General
- § 23.1543 - Instruments markings: General
- § 23.1549 - Powerplant instruments

3. BACKGROUND. The first document requiring a fuel pressure indicator was Civil Air Regulations (CAR) 4b, the predecessor to part 25 for transport aircraft. The requirement for fuel pressure indication applied to all large reciprocating engine airplanes. CAR 3 amendment 3-4, dated November 1, 1949, for small airplanes, required fuel pressure indicators be installed on airplanes with pump-fed engines. Many small airplanes of the era used gravity-fed fuel systems, which made a fuel pressure indication unnecessary. Also, a fuel pressure indication was not required if the fuel pump was certified as part of the engine. Since early fuel pumps were less reliable by today's standards, the intent of the requirement was to offer the pilot advanced warning of a fuel pump failure. Another reason for the requirement was to provide the pilot with diagnostic capability.

Horizontally opposed engines gained popularity and grew in displacement, evolving in two different types of fuel injection systems. These two systems are still predominant today. One consists of a fuel injector/metering unit that relies on a separate pump to supply fuel to the injector. This pump is referred to as a constant pressure pump. Since the metering (regulating) is done at the injector, fuel pressure is not critical and any pump that provides a specific range of pressures is adequate. If the injector has a 20 pound per square inch (psi) requirement, 23-30 psi pump pressure is acceptable because the fuel pressure on the outlet side of the injector is 20 psi. If the pressure out of the pump falls below 20 psi, the injector will fail to provide adequate fuel to the engine.

The second fuel injection system uses the fuel pump as an integral member of the system. This pump is referred to as an integral speed-sensing pressure pump. It delivers fuel at a pressure proportional to engine speed. Any change in pump pressure results in a change in engine operation.

Past policy has resulted in confusion over what is acceptable for fuel system monitoring, including indication and location of the pressure pick-up. In some installations utilizing the constant pressure pump, a differential pressure gauge measured unmetered fuel pressure at the fuel pump output. A differential pressure gauge measures the difference between the pressure of the fuel at the carburetor inlet and the pressure of the air at the carburetor upper deck. On the other hand, engine installations using the integral speed-sensing pressure pump have been approved with a fuel flow indicator measuring metered fuel pressure at the fuel distribution valve. Airplanes utilizing this system have a fuel pressure indicator calibrated in fuel flow. Policy has allowed fuel indicators measuring metered fuel flow to be used as an equivalent means of compliance if the engine was certified with an integral speed-sensing pressure pump and differential pressure was used for the measurement.

4. DISCUSSION. The original intent of the fuel pressure indicator requirement for pump-fed engines was to advise the pilot of a fuel pressure deficiency before total engine failure. Modern reciprocating engines use more reliable fuel pumps than those built in the 40's and 50's. Today, airplane owners are concerned about ways of extending the life of their engines and operating them economically; fuel pump failures are not as frequent. Furthermore, all pump-fed engines utilizing separate (not certified with the engine) fuel pumps must have an emergency fuel pump in addition to the main fuel pump. Reciprocating engines run better and last longer if the fuel to air mixture is leaned out as recommended by the manufacturer. Although leaning should always be done by referencing the exhaust gas temperature (EGT), fuel flow is often specified for engine operations. In these cases, fuel flow should be compared to the EGT setting. Fuel flow also relates to power, which pilots can use to quickly assess the condition of their

engine. Therefore, pilots prefer to monitor fuel flow more than fuel pressure for engine information, performance, and engine life.

5. ACCEPTABLE MEANS OF COMPLIANCE. Carbureted engines are included in the regulation, even though they have not been mentioned before now. Historically, carbureted engines used fuel pumps that were certified with the engine and, therefore, did not require the indicator. Since other arrangements may be used in the future, the definition of "pump-fed" needs to be clear. Pump-fed refers to a pump system not certified as part of the engine, that delivers fuel to the engine not including emergency fuel pumps.

Confusion with means of complying with the fuel pressure indicator requirement stems from the different types of injection systems manufactured. The fuel pressure indicator requirement was meant to measure the unmetered fuel pressure at the output of the pump. The solution was easy in a system using a constant pressure pump. Install the fuel pressure pick-up at the pump output. The indicator displays the actual pump output versus the fuel the engine uses, and the pilot can see fuel pump degradation prior to seeing a change in engine operation. A fuel flow gauge could also offer advanced warning of fuel pump failure, but unmetered fuel flow information does not represent the actual fuel the engine is burning. This can occur because the unmetered fuel could flow at 20 gallons/hour while the engine is really using 15 gallons/hour. The excess fuel is returned to the fuel tank. Replacing a fuel pressure indicator with a fuel flow indicator on the unmetered side of the injector provides no new information, invites confusion, and decreases safety.

In a system using an integral speed-sensing pressure pump, the installation becomes more confusing. The fuel pump is driven directly by the engine and is sensitive to revolutions per minute (RPM). Any change in pump output results in a change in engine operation. In this system, installing the fuel pressure pick-up at the pump output measures metered fuel flow. Although this reading has normal operation and diagnostic value to the pilot, in the event of an engine failure, no advanced warning is provided because the engine responds to fuel fluctuations within seconds of the gauge indication. In this case, the fuel pressure or fuel flow indication does not meet the intent of the requirement because metered fuel flow does not offer advanced warning of pump failure. Therefore, a fuel pressure or flow indication is not required on engines using these fuel injection systems.

DRAFT

BARRY D. CLEMENTS
Manager, Small Airplane Directorate
Aircraft Certification Service

[4910-13]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 23

[Docket No. ; Notice No.]

RIN: 2120-

Powerplant Instruments; Fuel Pressure Indication

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: This notice proposes to amend the certification requirement for fuel pressure indicators on pump-fed engines to permit other regulatory alternatives to warn pilots of imminent fuel pressure loss. A fuel pressure indicator is not the only means currently available in the marketplace to warn the pilot of a fuel pump failure. The proposed change would allow manufacturers to utilize new technology to improve operation, economy, and engine life. With these goals met, engine reliability and longevity will improve, resulting in increased safety.

DATES: Comments must be received on or before (60 days after publication in the Federal Register.)

ADDRESSES: Comments on this notice should be mailed in triplicate to: Federal Aviation Administration, Office of the Chief Counsel, Attention: Rules Docket (AGC-10), Docket No. , 800 Independence Avenue SW., Washington, DC 20591. Comments delivered must be marked Docket No. . Comments may be

inspected in room 915G weekdays between 8:30 a.m. and 5 p.m., except on Federal holidays.

In addition, the FAA is maintaining an information docket of comments in the Office of the Assistant Chief Counsel, ACE-7, Federal Aviation Administration, Central Region, 601 East 12th Street, Kansas City, Missouri 64106. Comments in the information docket may be inspected in the Office of the Assistant Chief Counsel weekdays, except Federal holidays, between the hours of 7:30 a.m. and 4 p.m.

FOR FURTHER INFORMATION CONTACT: J. Lowell Foster, Standards Office (ACE-112), Small Airplane Directorate, Aircraft Certification Service, Federal Aviation Administration, 601 East 12th Street, Kansas City, Missouri 64106; telephone (816) 426-5688.

SUPPLEMENTARY INFORMATION:

Comments Invited

Interested persons are invited to participate in the making of the proposed rule by submitting such written data, views, or arguments as they may desire. Comments relating to the environmental, energy, or economic impact that might result from adopting the proposals in this notice are also invited. Substantive comments should be accompanied by cost estimates. Comments should identify the regulatory docket or notice number and should be submitted in triplicate to the Rules Docket address specified above. All comments received on or before the closing

date for comments specified will be considered by the Administrator before taking action on this proposed rulemaking. The proposals contained in this notice may be changed in light of comments received. All comments received will be available, both before and after the closing date for comments, in the Rules Docket for examination by interested persons. A report summarizing each substantive public contact with Federal Aviation Administration (FAA) personnel concerned with this rulemaking will be filed in the docket. Commenters wishing the FAA to acknowledge receipt of their comments submitted in response to this notice must include a preaddressed, stamped postcard on which the following statement is made: "Comments to Docket No. .". The postcard will be date stamped and mailed to the commenter.

Availability of NPRM

Any person may obtain a copy of this NPRM by submitting a request to the Federal Aviation Administration, Office of Public Affairs, Attention: Public Inquiry Center, APA-200, 800 Independence Avenue, SW., Washington, DC 20591, or by calling (202) 267-3484. Communications must identify the notice number of this NPRM.

Persons interested in being placed on the mailing list for future NPRMs should request, from the above office, a copy of Advisory Circular No. 11-2A, Notice of Proposed Rulemaking Distribution System, which describes the application procedure.

Background

Statement of the Problem

The FAA proposes to amend Federal Aviation Regulation (FAR) § 23.1305(g) allowing alternative means of compliance to certification standards for fuel pressure indicators. Requiring a fuel pressure indicator on airplanes powered by pump-fed engines does not reflect the sole means of compliance available to the general aviation market today. Engine sensor developments necessitate broadening the scope of the regulation such that the new technology can be incorporated in small airplanes, improving the level of safety and possibly reducing the costs.

History

The first regulatory requirement for a fuel pressure indicator was Civil Air Regulation (CAR) 4b, the predecessor to part 25 of the FAR for transport aircraft. That requirement applied to all reciprocating engine airplanes. CAR 3, the predecessor to part 23 of the FAR, amendment 1, adopted December 15, 1946, for light airplanes, required fuel pressure indicators on airplanes with pump-fed engines. Many small airplanes of that era used gravity-fed fuel systems, which made a fuel pressure indication unnecessary. Also, a fuel pressure indication was not required if the fuel pump was certified as part of the engine. Since early fuel pumps were less reliable, the intent of the CAR requirements was to provide the pilot with

advance warning of a fuel pump failure and the diagnostic capability to prevent engine failure.

As horizontally opposed engines gained popularity and grew in displacement, two different types of fuel injection systems emerged. One consisted of a fuel injector/metering unit that relied on a separate constant pressure pump to supply fuel to the injector. Since the metering (regulating) was done at the injector, the fuel pressure required was not critical and any pump that could provide a specific range of pressures was adequate. If the injector had a 20 psi requirement, 23-30 psi pump pressure was acceptable because the fuel pressure on the outlet side of the injector was 20 psi. If the pressure out of the pump fell below 20 psi, the injector would fail to provide adequate fuel to the engine.

The second fuel injection system used an integral speed-sensing pressure fuel pump as a component of the system. It delivered fuel at a pressure proportional to engine speed. Any change in pump pressure resulted in a change in engine operation.

Regulatory interpretation resulted in confusion over what was acceptable for fuel system monitoring, including indication and location of the pressure pick-up. Some installations utilizing the constant pressure pump required a differential pressure indicator measuring unmetered fuel pressure at the fuel pump output. On the other hand, installations using the speed-sensing integral pump system have been approved with a fuel pressure indicator measuring metered fuel pressure at the fuel

distribution valve. Airplanes utilizing this system have a fuel pressure indicator calibrated in fuel flow. Policy allowed fuel indicators measuring metered fuel flow to be used as an equivalent means of compliance if the engine was certified with an integral speed-sensing pressure pump and differential pressure was used for the measurement.

The Aircraft Owners and Pilots Association (AOPA) petitioned the FAA for new standards that would allow, on all pump-fed engines, a fuel flow system employing a differential pressure transducer to be accepted as an equivalent means of compliance to the current fuel pressure indicator requirements. The AOPA believes that this action would open the door for the development of new and valuable engine monitoring equipment, while potentially reducing the instrument panel clutter.

Following receipt of AOPA's petition for rulemaking, the FAA requested that the Aviation Rulemaking Advisory Committee (ARAC) review the petition and recommend a disposition to the FAA. The ARAC was chartered in February 1991, under the Federal Advisory Committee Act, to provide recommendations to the FAA Administrator on FAA rulemaking activity relating to aviation safety issues.

In January 1992, the Fuel Indicators Working Group of the ARAC's General Aviation and Business Airplane Issues Group reviewed AOPA's petition. The working group and, subsequently, the ARAC issues group, recommended that the FAA revise the certification standards for fuel pressure indicators. The

working group agrees with AOPA's petition but feels the language is too restrictive. Major technical advances in the auto industry with engine systems and controls may offer improvements over the current warning systems. Avenues should be open allowing this ever-evolving technology to be used. The working group proposed wording that would allow the use of any system offering the pilot advance warning of a fuel pump failure.

General Discussion of the Proposals

The original intent of the fuel pressure indicator requirement for pump-fed engines was to advise the pilot of a fuel pressure deficiency before total engine failure. Modern reciprocating engines utilize more reliable fuel pumps than those built in the 40's and 50's. Today, airplane owners are concerned about ways to extend the life of their engines as well as operating them economically. Furthermore, all pump-fed engines utilizing separate (not certified as part of the engine) fuel pumps must have an emergency fuel pump in addition to the main fuel pump. Reciprocating engines run better and last longer if the fuel to air mixture is leaned out according to the manufacturers' specified setting. Often, a fuel flow is specified for engine operations; therefore, pilots are interested in fuel flow more than fuel pressure when optimizing engine performance and engine life. Fuel flow also relates to power and pilots can use fuel flow to quickly assess the health of their engine.

Comprehensive engine monitors and redesigned electronic engine instrument displays are already being used in experimental aircraft. Though benefits of the new approaches to engine monitoring are still unknown, the FAA should allow airplane manufacturers to utilize new technology to improve operation, economy, and engine life. New engine monitoring systems may improve reliability and engine life, resulting in increased safety.

Paperwork Reduction Act

In accordance with the Paperwork Reduction Act of 1990 (44 U.S.C. 3501 et seq.), there are no reporting or recordkeeping requirements associated with this proposed rule.

Regulatory Evaluation Summary

Three requirements pertain to economic impacts of regulatory changes to the FARs. First, Executive Order 12291 directs Federal agencies to promulgate new regulations or modify existing regulations only if the potential benefits to society outweigh the potential costs. Second, the Regulatory Flexibility Act of 1980 requires agencies to analyze the economic impact of regulatory changes on small entities. Finally, the Office of Management and Budget directs agencies to assess the effects of regulatory changes on international trade. In conducting these analyses, the FAA has determined that this rule: 1) would generate benefits exceeding costs and is neither major as defined

in the Executive Order nor significant as defined in DOT's Policies and Procedures; 2) would have no significant impact on a substantial number of small entities; and 3) would have no impact on international trade. These analyses, available in the docket, are summarized below.

Benefits and Costs

Because the proposed rule change would be optional by permitting, but not requiring, alternative means of warning pilots of fuel pressure loss, it would provide an equivalent or improved level of safety without involuntarily imposing new requirements or costs on aircraft manufacturers. On this basis, the FAA finds it to be cost-beneficial. To the extent that it would encourage the development and utilization of comprehensive engine control, monitoring and diagnostic systems, it would contribute further benefits in the form of enhanced safety and improved fuel efficiency, power output, and engine life.

Regulatory Flexibility Determination

The Regulatory Flexibility Act (RFA) of 1980 was enacted by Congress to ensure that small entities are not unnecessarily or disproportionately burdened by government regulations. The RFA requires a Regulatory Flexibility Analysis if a rule is expected to have a "significant (positive or negative) economic impact on a substantial number of small entities." Based on the standards and thresholds of implementing FAA Order 2100.14A, Regulatory

Flexibility Criteria and Guidance, the FAA has determined that the proposed rule would not have a significant impact on a substantial number of small aircraft manufacturers.

International Trade Impact Analysis

The proposed rule change would have no impact on the sale of United States products in foreign markets or the sale of foreign products in the United States.

Federalism Implications

The regulations proposed herein would not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. Therefore, in accordance with Executive Order 12612, it is determined that this proposal would not have sufficient federalism implications to warrant the preparation of a Federalism Assessment.

Conclusion

The FAA proposes to amend the airworthiness standards to allow airplane manufacturers to utilize new technology for fuel pump monitoring to improve the operation, economy, and engine life of part 23 airplanes powered by pump-fed engines. The current requirements provide for a fuel pressure indication that warn the pilot of an imminent pump failure but limit the means of

compliance. The dramatic advances in auto engine systems and electronics offer technology that should be utilized by the aviation community. By broadening this airworthiness standard, new engine monitoring systems may be utilized that will improve reliability, lower operating costs, and increase safety.

For the reasons discussed in the preamble, and based on the findings in the Regulatory Flexibility Determination and the International Trade Impact Analysis, the FAA has determined that this proposed regulation is not major under Executive Order 12291. In addition, the FAA certifies that this proposal, if adopted, will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act. This proposal is not considered significant under DOT Regulatory Policies and Procedures (44 FR 11034; February 26, 1979). An initial regulatory evaluation of the proposal, including a Regulatory Flexibility Determination and Trade Impact Analysis, has been placed in the docket. A copy may be obtained by contacting the person identified under "FOR FURTHER INFORMATION CONTACT."

List of Subjects in 14 CFR Part 23

Aircraft, Air transportation, Aviation safety, Safety.

THE PROPOSED AMENDMENT

In consideration of the foregoing, the Federal Aviation Administration proposes to amend part 23 of the Federal Aviation

Regulations (14 CFR part 23) as follows:

PART 23--AIRWORTHINESS STANDARDS: NORMAL, UTILITY, ACROBATIC,
AND COMMUTER CATEGORY AIRPLANES

1. The authority citation for part 23 continues to read as follows:

Authority: 49 U.S.C. 1344, 1354(a), 1355, 1421, 1423, 1425, 1428, 1429, 1430, 49 U.S.C. 106(g).

2. Section 23.1305 is amended by revising paragraph (g) to read as follows:

§ 23.1305 Powerplant instruments.

* * * * *

(g) A means to indicate imminent loss of fuel pressure for each pump-fed engine.

* * * * *

Issued in Washington D.C. on